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ABSTRACT

This paper reviews traditional analog time-telling instructional procedures and introduces the Applied Digital Method (ADM), a newer technique using a digital paradigm. The ADM is a favorable method for teaching time-telling to special needs students and non-disabled young children. Students' rate of learning is greatly influenced by developmental variables of short-term memory, understanding abstract numerical concepts, and the desire and need to learn time-telling skills. Traditional uses of the sundial and one-handed clocks prove difficult for many children to comprehend. Development of these methods was based on the analog clock, once the only accurate timepiece available. While the analog clock face contains all numerals through 12 in hours, and zero through 59 in minutes, the digital timepiece displays only those numbers which are required to determine the time. The ADM, taught throughout the day, requires that certain in-class responsibilities be shifted from the teacher to the students. The method incorporates the use of a digital clock, static cardboard replicas, and wall murals depicting school-day activities. Students are taught how to read digital numerals. Then, at various times during the day, they respond to the questions "What time is it?" and "What do we do now?" taking cues from the replicas and drawings. As the students learn the time of day, the murals are removed. The ADM requires only that students learn basic numeral recognition skills to become effective time-tellers. Five references and three sample murals are attached. (TES)

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Digital-First Approach to Teaching Temporal Concepts To Preschool Exceptional Children

In today's society it is important that the skill of time-telling be taught at an early age. It is equally important that this time-telling skill be introduced at the appropriate developmental age to the students. Researchers have indicated that young children are not cognitively prepared to functionally attain time-telling skills until they have established the developmental notions of object permanence and reversibility, occurring at about six to seven years of age(Creekmore, 1981).

Historically, time-telling skills have been taught at the second grade level after these developmental milestones have been attained by most children. Not only are educators responsible for teaching this very important skill to normal children, but they also have the added challenge of teaching time-telling skills to special needs learners.

This presentation reviews traditional analog time-telling instructional procedures as well as introduce a unique and developmentally sound "applications first" technique utilizing a digital time-telling paradigm.

TRADITIONAL TIME-TELLING TECHNIQUES:

Parents and educators have complained of the complexity of teaching traditional time-telling skills to children. The complaints are focused on the difficulties in teaching abstract numerical concepts, recognizing passage of time, and applying the unique usage of numerals (depicting passage of time rather than identifying the number of objects in a set). Teachers must realize that the developmental variables of short-term memory, understanding abstract concepts, and the desire and need to learn time-telling skills on the part of the individual students will greatly influence and accelerate the rate of learning(Johnson, 1979).

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Reisman (1971), an educator, has indicated that if all developmental prerequisites are intact, a child must learn a series of 54 desired steps in order to tell time to the minute. Because many normal, learning disabled and mildly mentally handicapped children do not have the prerequisite skills needed to accomplish these tasks, frustration and failure often occur.

Traditional time-teaching strategies such as utilization of the sundial, one-handed clocks, and minute clocks (Thompson,Van de Walle, 1981) prove to be complex and difficult for many children to comprehend. Children with spatial orientation problems are overwhelmed by these complicated and detailed techniques.

Likewise, Nelson (1982) presented a method of teaching time-telling using a seven-step sequence. The areas of time-telling skills and the concept of time were used to establish the need for students to acquire these skills. These methods also proved to be equally confusing for students.

According to Reisman, traditional time-telling

> "...involves the ability to return to a beginning point and to recreate the paths that the hands have traversed. Second since children learn to count by ones first, and since counting by ones is the basis for telling time to the minute, this skill should be taught first rather than last in the time-telling sequence." (Reisman, 1971, p. 152).

All of the traditional methods utilize concrete approaches to teach a set of abstract concepts which we call "TIME". These approaches all contain common elements of concrete objects and analog timepieces. The development of these methods was based on the reality that the analog clock was the only accurate time telling mechanism available. With rapid developments in electronics, this is no longer true. The digital timepiece has evolved making methods for telling time much easier.

The authors have attempted to review literature on time-telling methods and have found traditional teaching techniques less than efficient. It is our belief that many of the difficulties and frustrations accompanying traditional strategies of teaching time-telling skills can be eliminated through the use of an alternate method which utilizes the digital timepiece exclusively. Because the APPLIED DIGITAL METHOD possesses the components of simplicity and direct utility, it could possibly be the most desirable method to use for time-telling instruction.

HIGH-TECH TIME-TELLING:

Teachers are aware that the face of an analog clock is "busy" containing numerals which have no utility for the students unless they are the ones to which the hour and minute hands point specifically. At any given time, these unnecessary numerals can be considered nothing but "distractors" or "confusers". In looking at the standard digital timepiece, the teacher is aware that the face contains only those numerals which are required to determine the exact time. In addition, the digital clock tells time dynamically, through the use of the flashing colon. This element must be inferred with the analog clock, unless it has a second hand.

In working with slow learners, learning disabled and students with significant cognitive deficits, "clean" versus distracting clock faces should prove to be a very important element in instruction due to the distractibility, ocular confusion, and perceptual problems found in many special needs learners.

As is the case in teaching students to use the analog clock, students must have prerequisite skills in order to be successful in using the digital clock. Recognition of numerals, numeral calling skills (one through 12 on the hour side and one through 59 on the minute side), identification of the letters "A" and "P" and their meaning in the time-telling context, are all that are required as prerequisite skills for students to be able to use the digital clock.

Given the strengths and weaknesses of both time-telling mechanisms, it would seem that the digital timepiece may be the instrument of choice for teaching basic time-telling skills to lower elementary regular and special needs students.

APPLIED DIGITAL METHOD
HOW?

Continuing to slaughter the "sacred calf", a time-telling curriculum should be taught throughout the day rather than at discrete times (just once in the morning, three days a week). The APPLIED DIGITAL METHOD requires that the teacher shift the responsibility for performing certain in-class specific duties from her to the students.

Within the classroom scheduling there are certain time-specific responsibilities which fall only within the perview of the teacher. Activities such as calling roll and completing lunch and absentee reports would be categorized as "administrative-specific" tasks. The second block of time related to behavior is classified as "instruction-specific". This would include the actual time allotted

for reading, math, handwriting etc. These too, are the responsibility of the teacher.

The third segment of the day could be considered "fresh meat" for time-telling applications. This can be considered the "student-specific" block of time-related behaviors which would be those segments of the day that directly effect students in non-academic ways. Some examples might include recess, lunch period, and end-of-the-day activities.

The APPLIED DIGITAL METHOD incorporates the use of a simple digital clock (one that includes hour and minute numerals only) and static cardboard replicas of digital clocks and murals depicting specific school day related activities.

METHOD:

In this technique the teacher assembles a time-sequenced array of graphic cartoon murals depicting key segments of her administrative, instructional, or student-specific day.

FIGURE OF MURAL ABOUT HERE

These murals are displayed in a location in the room easily visible to all students. A logical place would be directly above the chalkboard

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PICTURE OF CLASSROOM ABOUT HERE

TIME-TELLING SEQUENCE SUB-STEPS:

1. The teacher will guide the students in developing an awareness of numerals on a digital clock as compared to the actual time of day. This can be done by presenting several different digital timepieces with different times displayed, or by simply changing the time on the digital clocks themselves. Then individual students can be selected to call the numerals aloud.
2. The teacher will than introduce the murals to the class by discussing each time-related activity depicted.
3. The teacher will set a kitchen timer. When it alarms, the students will be directed to the digital clock and the appropriate mural. For example; if the class begins at 8:00 and the time on the next mural changes at 8:30, then the teacher will set the timer for 30 minutes.
4. The teacher will ask, "What time is it?" The students will response verbally.

5. The teacher will ask, "What do we do now?" The students will respond verbally.

6. The teacher will immediately initiate the activity scheduled. This is to establish a one-to-one correspondence between the activity and the time.

7. After completion of the activity, the teacher should cover that segment of the mural. This gesture demonstrates the passage of time to the students in a very graphic way.

8. Proceed through the day using the steps indicated above.

In each case, the teacher will reset the timer to correspond with the next mural and inform the children verbally that it is time to refer to the clock and murals once again.

As the class begins to learn to tell time accurately, the responsibility for activities such as setting the timer, covering the murals, and initiating the specific behaviors can be assigned to rows of children or individuals. As the students learn the time of the day, the murals are removed so that they do not become an unnecessary crutch.

TEACHING GENERALIZATIONS:

Through the use of the APPLIED DIGITAL METHOD, specific skills in time-telling can be easily acquired by both normal and special needs learners. In addition, the technique enhances an understanding of time sequencing, time-related individual independence on the part of the student, motivation for expanding and refining time-telling skills (including the use of the analog timepiece), self-confidence, improved skills in isolated numeral and combined numeral recognition, and internal locus-of-control(Creekmore and Creekmore, 1982).

CONCLUSIONS:

In a limited review of the traditional time-telling literature it has been demonstrated that this method is replete with contradictions or weaknesses in teaching time-telling to young children and special needs learners. The authors have proposed an alternative method which uses concrete instructional techniques, mural formats (which depict critical portions of the students' day, for which time-related actions are essential), and smooth generalizations to the real world. This technique requires students only to learn basic numeral recognition skills in order to become efficient and effective time tellers.

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8:15 =

Class begins

9:30 =

Reading class

11:45 =

lunch